Facilities Tour Stops

Day 1: LC-39 Area

- Launch Pad 39A & 39B Includes LOX, LH2, and Ops Support Building #2
- Vehicle Assembly Building
- Rotation, Processing and Surge Facility Main Building
- Crawler Transporter, CT Maintenance Facility, Mobile Launcher
- Thermal Protection Systems Facility
- Launch Control Center
- Launch Equipment Shop
- Logistics Facility

Day 2: Industrial Area & CCAFS

- Multi-Payload Processing Facility
- Payload Hazardous Servicing Facility
- Space Station Processing Facility
- Hangar AF Complex
- NASA Space Station Depot
- ISS Warehouse #1
- ISS Warehouse #2

Launch Pad A (J8-1708) and Pad B (J7-0337)

General Information and Characteristics

Launch pads A and B were built in the early 1960's for the huge Apollo/Saturn V rockets.

- Both pads are octagon-shaped and share similar features. Pad A is located 18,159 feet from the VAB and Pad B, 22,400 feet.
- Each pad covers about a quarter-square mile of land. Launches are conducted from atop a concrete hardstand 390 by 325 feet, located at the center of the pad area.
- Pad A supports MLPs 2 and 3 and contains legacy shuttle equipment except the hypergolic storage areas.
- Pad B will support an ML and 21CGS modifications. It has no fixed structure for a clean Pad concept . It has limited operational systems and is a construction area at this time.

Facility Systems Interfacing With ML/MLP

- Facility AC Power
- Compressed Air
- Chilled Water, Potable Water, Waste Water
- Firex Water, Fire Alarm

Fluids

- Liquid Oxygen (LO2) System
- Liquid Hydrogen (LH2) System with leak detection and flarestack system
- Environmental Control System (ECS) and environmental life support ECLSS

Gases

- Gaseous Nitrogen (GN2)
- Gaseous Helium (GHe)
- Gaseous Hydrogen (GH2)
- Gaseous Oxygen (GO2) – *Mobile tankers*
- Breathing Air

Mechanical and Structural

- MLP pedestals
- Fixed and Rotating Service Structure Pad A only
- Swingarms, *GOX vent and crew access*

Communication

- Operational Intercom System (OIS)
- Timing and Countdown System (T&CD)
- Paging and Area Warning System (PAWS)
- Kennedy Network (KNET)
- Kennedy Integrated Transmission System (KITS)
- Telephone
- Radios
- Broadband Communication Distribution System (BCDS)
- Operational Television

Electrical/Instrumentation

- Ground Special Power (GSP)
- Sensor Data Acquisition System (SDAS)
- Weather system (WX) [Lightning detection and measurements, meteorological data]

Command and Control

- Integrated Network Control System (INCS)

Facility Control

- Kennedy Complex Control System (KCCS)

Infrastructure

- Lightning protection system
  - Pad A - Lighting mast on top of FSS, Pad B - (3-tower with catenary wires) – protection height 456'
- Ignition Overpressure and Sound Suppression Water
- Flame Deflectors (Main and Side)

Vehicle Assembly Building (VAB K6-0848)

General Information and Characteristics

The Vehicle Assembly Building (VAB) is one of the largest buildings by volume in the world.

- It was built in the early 1960's for the assembly of Apollo/Saturn vehicles and was later modified to support Space Shuttle operations.
- The VAB covers 8 acres and is 525 ft tall, 716 ft long and 518 ft wide. It encloses 129,428,000 cubic feet of space.
- The VAB is divided into four separate high bays; Bays 2 and 4 are west facing and two bays facing east - Bays 1 and 3 - with a transfer aisle between.
- Doors: There are 4 high bay doors. Each opening is 456 ft high.
- The VAB will be utilized to assemble and integrate launch vehicles and spacecraft in vertical mode.
- Currently HB 1 and 3 support MLPs 2 and 3 using INCS and Firing room 4
- The VAB will undergo 21CGS modifications to support the ML using HB 3
- HB 1 is planned for multi-use and near term will support MLP 2 and 3.

Facility Systems and Equipment:

- Vertical Integration Structures (High Bays)
- Heating, Ventilation and Air Conditioning (HVAC) 10,000 tons, 125 ventilators.
- Facility Gaseous Nitrogen (GN2) Subsystem
- Facility Gaseous Helium (GHe) Subsystem
- Medium Voltage 60 Hz Power
- Low Voltage 60 Hz Power
  - 480-VAC, 3-phase
  - 208 VAC, 3-Phase (on VAB HB-3 platforms)
  - 120-VAC, 1-phase (on VAB HB-3 platforms)
- Potable Water, Wastewater
- Fire Suppression, Fire Detection
- Compressed Air
- Oxygen Deficiency Monitoring Subsystem (ODMS)
- Facility Grounding & Lightning Protection
- Elevators
- Emergency (Life & Safety) Power

Fluids

- Ground Cooling Subsystem

Gases

- Gaseous Oxygen (GO2) Subsystem
- Portable Purge Unit ground cooling systems
- GSE Breathing Air Subsystem

Mechanical

- Handling and Access Systems and Equipment
- Vehicle Assembly Building (VAB) Access Platforms

Command and Control

- Integrated Network Control System (INCS) HB 1 and 3
- Kennedy Complex Control System (KCCS) Facility systems

Structural

- Cranes : includes two 250-ton and two 325-ton bridge cranes (East – West) and one 175-ton bridge crane along the transfer aisle (North - South).

Communication

- Kennedy Integrated Transmission System (KITS)
- Kennedy Network (KNET)
- Operational Intercommunication System (OIS)
- Telephone System
- Paging and Area Warning System (PAWS)
- Operation Television (OTV)

Miscellaneous

- Laser Alignment

Rotation Processing and Surge Facility (RPSF K6-0494)

Facility Systems and Equipment :

- Two 200-ton Cranes
- Radio System
- Compressed-Air System
- Environmental Control Subsystem (ECS)
- Water Fire Suppression System

Offline Processing Activities:

- Exit Cone Railcar Positioning, Cone Removal and Build-up stand Positioning, and Railcar Reconfiguration
- Booster Aft Skirt Assembly Receiving, Inspection, Move and Install on Buildup Stand
- Aft Motor Segment
- Aft Booster Assembly Build-Up
- Aft Booster Assembly Complete Move to Pallet
- Solid Rocket Motor Segment Storage and Transport

Capability Description:

The RPSF was built in 1984 to receive solid rocket motor segments via railcar, offload, inspect and prepare them for delivery to the Vehicle Assembly Building. The facilities isolate hazardous operations associated with solid rocket motor rotation and processing, formerly performed in high bay 4 of the VAB, thereby averting impacts to VAB processing. The RPSF complex is comprised primarily of a central rotation/processing facility, an operations support building and two segment surge buildings.

Overview:

The RPSF rotation and processing building is serviced by two 200-ton cranes and several access stands.
The Surge facilities are primarily large storage areas capable of holding a total of 8 solid rocket motor segments each. The processing building and surge facilities are both serviced by a water fire suppression system
The processing building and surge facilities are not environmentally controlled (maintained at ambient conditions).

Crawler Transport Maintenance Facility (K6-0743)

Facility Overview

The Crawler Transporter Maintenance Facility (K6-0743) is used for daily operations and maintenance tasks on the two Crawler Transporters. The facility includes a north and south parking location (crawlerway extension) for the two transporters, a maintenance highbay with limited shop capability (25-ton bridge crane, shop air, and other miscellaneous maintenance equipment), and office and shop areas for transporter personnel. Electrical shore power and fire system cable connection panels are located at each Crawler Transporter parking location.

The two Solid Rocket Motor (SRM) segment transporters have also been maintained in this facility. A nearby storage warehouse (K6-0545) has also been used to store the SRM Transporters and associated transporter hardware and equipment.

Crawler Transporter Statistics:

Height
Minimum (Cylinders retracted) .....20 feet
Maximum (Cylinders extended) .....26 feet

Size .....131 feet long / 113 feet wide

Cylinders
Jacking Hydraulic .....20-inch diameter (16 ea)
Steering Hydraulic ....14.5-inch diameter (16 ea)
Guide Tube.....48-inch diameter (4 ea)

Weight
Overall .....5.5 million pounds

Speed
Loaded .....0.8 mph
Unloaded .....1.0 mph

Mobile Launch Platform, Mobile Launcher and Park Sites (K6-0546)

Mobile Launcher Statistics:

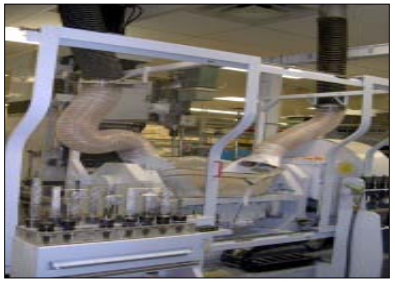
Height
405 feet
Weight
6.75 million lbs
Size ..... 160 feet long / 135 feet wide

Facility systems construction completed Oct 2010

GSE installation (Phase II) construction to commence FY13

The Mobile Launcher Refurbishment Area (K6-0546) is comprised of two locations available to position a Mobile Launch Platform or Mobile Launcher. The two locations have historically been known as the “East Park Site” and “West Park Site”. The East Park Site has been used extensively throughout the Shuttle Program for post-launch Mobile Launcher Platform (MLP) refurbishment. The West Park Site was used sparingly throughout the Shuttle Program because of limited availability of support commodities. Both park sites contain six structural mount mechanisms and a 480 VAC power connection. Additionally, the East Park Site contains personnel access towers to the MLP, as well as extensive power, pneumatics, Firex, and other water systems commodity connections.

Thermal Protection System Facility (TPSF K6-0794)



FACILITY OVERVIEW

This one- and two-story building, with an approximate total area of 44,000 square feet, was used for the manufacture and repair of the Space Shuttle's thermal protection and thermal control systems, which included tiles, gap fillers, insulation blankets, coatings, and adhesives.

CAPABILITIES / SERVICES

- CAD/CAM
- Ceramic Tile Production Unit Fabrication*
- Machining of Ceramics and Composites
- High Temperature processing
- Ceramic Material Waterproofing & Densification
- Materials and Chemical Preparation
- Molding and Vacuum bonding with silicones
- Molding of polyurethane foam and tooling plastic
- Specialty Aerospace Insulation (soft goods) manufacturing*

* Currently KSC TPSF is the only location with this capability.

EQUIPMENT

- **Tile Production Unit Fabrication**
  casting towers, blenders, mixers
- **Machining**
  NC mills, saws, burring tools
- **High Temp Processing/Waterproofing/Dens**
  Roller mills, spray booths, kilns, ovens
- **Bond Room**
  Vacuum tables
- **Soft goods**
  Customized sewing machines
  Multi-needle machine

ACCOMPLISHMENTS

- Manufacture of flight hardware used in the Orbiter Thermal Protection System (TPS) and Thermal Control System (TCS)
- Encompasses the widest range of TPS manufacturing and repair capabilities ever to exist within a single facility.
- Production rate of over 5000 flight items per year
- X-38 and CEV thermal protection system tiles and thermal seals
- NASCAR thermal insulators
- CRYOTE MLI blankets

Launch Control Center (LCC K6-0900)

Capability Description

The LCC was built in the 1966 to support the Apollo program replacing the blockhouse concept of locating launch control adjacent to the launch pads. The LCC is the centralized command and control facility within Launch Complex-39 area, directly and indirectly supporting Shuttle ground processing, launch and recovery. The LCC is also home to several unique centralized support control rooms and functions within its four stories.

Facility Overview

The LCC is a secured facility encompassing 230,436 square feet with an access controlled perimeter housing several individually access controlled centers within the LCC:

- LC-39 Firing Rooms: There are 4 firing rooms that were command and control for all phases of Shuttle processing. Firing room 1 will support 21CGS systems and SLS. Firing 4 currently operates with Pad A, MLPs 2,3, and VAB. Rooms 3R18 and 3P16 have network control and safing equipment for the systems at these sites. KSC emergency response coordination is managed with specialized communications equipment within each firing room to include Paging and Area Warning System (PAWS) panels and specialized panels to support launch countdown contingences.
- Central Operations Facility (COF): Provides Duty Office and emergency operations support, Emergency Operations Center (EOC) ride-out location
- Complex Control Center: Provides facility systems control, KCCS (Kennedy Complex Control System) for remote monitoring and control of field equipment associated with 150+ systems (High Voltage, Low Voltage, Oxygen Deficiency Monitoring System, Pneumatics, Heating, Ventilation and Air Conditioning (HVAC), Firex and Sound Suppression Water etc.).

Launch Equipment Shop (LES K6-1247)

Facility Overview

The Launch Equipment Shop, a 41,000 square foot facility, consists of a number of technical shops that provide a wide range of technical skills and equipment for the fabrication, modification, refurbishment, maintenance and repair of Shuttle facilities, systems and Ground Support Equipment (GSE).

- Machine and Weld Shop
- Sheet Metal and Assembly & Repair Shops
- Paint Shop
- Electrical/Electronic and Institutional Maintenance Shop
- Pneumatic Shop
- Thermoform Lab

Facility Systems and Equipment:

- 5-Ton Bridge Crane
- Trumpf CNC Punch Press
- Omax Abrasive-Jet Machine
- Mills, Iron Worker, Notcher, Manual and Computerized Brakes, Presses, Cutters, Grinders, Lathes, Saws, Shears, Rollers, Planers, Punches, etc.
- Tunnel Oven, Cable Test Set, Cable Tagger, Sonar Tester, Cable Analyzers, Curing Ovens, etc.

Logistics Facility (K6-1547)

Facility Overview

The Logistics Facility (K6-1547), constructed in 1986, is a 324,640 square foot general warehouse which is currently used to store more than 200,000 items of Shuttle flight hardware and GSE. It supports warehousing, procurement, inventory management, logistics engineering, transportation, packaging, shipping and receiving. The building contains state-of-the-art warehousing material handling equipment, including an Automatic Parts Retrieval and Storage System. Of the 275,000 square feet total floor space, 64,200 square feet is air-conditioned.

Facility is utilized to store the following materials:

- flight spares hardware,
- flight GSE spares hardware,
- facility/GSE spares, and
- general purpose launch material.

Facility Systems and Equipment:

- Cantilever and palletized storage areas
- Automated Storage and Retrieval System
  - Bins arranged vertically (45 trays high, 56 trays deep, 10 rows of 2,520 trays)
  - Each tray can hold 300 lbs
  - Air-conditioned storage for smaller items
- 3 Crown Man-Aboard vehicles that are guided manually and by in-floor wire system
- 2 Raymond Side Loaders that are guided manually and by an in-floor wire system
- 3 Automatic Guided Vehicles guided by in-floor wire, ceiling transmitters, and internal navigation computers
- 5 crane retrieval lanes & operator stations

Multi-Payload Processing Facility (MPPF M7-1104)

Facility Systems and Equipment:

- 20-ton bridge crane (highbay)
- GHe (highbay only):
  - 3,000 psig
  - 750 psig
- GN2
  - 3,000 psig – (highbay only)
  - 750 psig
- Compressed Air
  - 125 psig
  - 90 psig
- Vacuum throughout facility
- Equipment airlock
- Potable water highbay/lowbay floors

The MPPF complex comprises three major structures. The major structures are: the MPPF, containing a highbay, lowbay, and equipment airlock, the Annex building contains administrative offices, and two Payload Operation Control Centers (POCC). The MPPF is currently used to process non-hazardous payloads.

The MPPF highbay is 132 ft long x 60 ft wide with a ceiling height of 62 ft. The lowbay is a 34 ft long x 34 ft wide processing area and has a ceiling height of 20 ft. The equipment airlock is 39 ft long x 28 ft wide with a ceiling height of 20 ft. The MPPF was constructed by NASA in 1994.

The highbay includes a 20-ton bridge crane. The highbay and lowbay meet the requirements of a Level 4 class 100,000 CWA and the equipment airlock meets a Level 5 class 300,000 CWA.

A single-story flight data communications room (room 1145) is connected to the MPPF on the southeast wall of the highbay and provides fully-equipped racks and wall mounted equipment to support the following communication systems:

- Administrative and Data Communications (A&DC)
- Broadband Cable Distribution System (BCDS)
- Operational Intercommunications System - Digital (OIS-D)
- Paging and Area Warning (P&AW)
- Timing and CountDown (T&CD)
- WideBand/Fiber Optics (WBFO)

Payload Hazardous Servicing Facility (PHSF M7-1354)

Facility systems and equipment:

- Cranes
  - 15-ton bridge crane in airlock
  - Two 50-ton bridge cranes in service bay
- Compressed Air
  - 90 psig
  - 150 psig
- GN2 50 psig
  - 750 psig
  - 3000 psig
- GHe 50 psig
  - 1000 psig
  - 3000 psig
  - 3800 psig
- Vacuum System 9” of mercury
- Breathing Air
  - 65 psig
  - 120 psig

The PHSF is a Level 4, class 100,000 clean room that can be used as a Payload Processing Facility (PPF) and/or a Hazardous Processing Facility (HPF). When used as a PPF, the processing flow may include installation of solar panels, antennas and other items by the spacecraft builder. When used as an HPF, the PHSF accommodates the following: ordnance installation; loading of liquid propellants (e.g., hypergolic propellants); hazardous systems tests and checkout; buildup and mating of a payload to a solid propellant upper-stage motor; propellant system leak tests; and other potentially explosive or hazardous operations.

Space Station Processing Facility (SSPF M7-0360)

The SSPF consists of an administrative area, Intermediate bay (I-bay) area, and High Bay (HB) area. Currently, the I-bay is used for processing of ORU's.

High Bay: 105'W x 362'L x 61'6"H, Class 100,000 Clean Work Area (CWA);

- 8 footprints, completely reconfigurable, stub ups provide (4) 60 Hz, chilled water, GN2, GHe; LN2
- Two 30-ton electrical highbay bridge cranes with 50' max hook height

Intermediate Bay : 50'W x 338'L x 30'H Class 100,000 CWA

- Two 5-ton electrical bridge cranes with 25' max hook height

Airlock: 46'W x 108'L x 61'6"H, Class 300,000 CWA

- 15-Ton electrical bridge crane with 50'7" max hook height
- Vertical Door Size 42'W x 49'6"L (both ends)
- Payload Canister Compatible: Horizontal orientation only

Administrative Space

- Office Space for approximately 1000 desks
- Approximately 25 Conference Rooms

Specialty Areas

- 16 Off-Line Processing Rooms; 9 science labs and 7 hardware labs
- 10 control rooms located on raised floor areas
- Vapor Containment Facility to house liquid anhydrous ammonia

SRB Recovery Building – Hangar AF (66250)

Hangar AF originally was used as the Saturn IB and Saturn V staff headquarters and administrative support offices. By the end of 1978, Hangar AF was transformed into the SRB Recovery and Disassembly Facility.

The facility and ground systems are used for removing the SRBs from the water, inspecting, washing and disassembling SRBs into the main segments, aft skirt and forward skirt assemblies. The SRBs, frustums, and parachutes are off-loaded from the retrieval vessels at the dock in the Hangar AF area. Each SRB is lowered onto a rail dolly and driven through the First Wash Building for a cleaning and rinsing. Tunnel covers and cabling are removed from the SRB. Flight termination ordnance is removed from the forward skirt, and the Thrust Vector Control (TVC) system is depressurized. Marshall Space Flight Center personnel conduct Open Assessment. From there, the SRBs are moved inside Hangar AF where the nozzles are removed and the four SRB segments are separated from each other, beginning with the forward skirt. Interior segment cleanout is performed.

List of Hangar AF Area Facilities utilized by TOSC:

- SRB retrieval and recovery slip and wharf
- Hangar AF
- First Wash Building

GSE Subsystems:

- Two 40-ton overhead cranes
- 200-ton straddle lift crane
- GN2
- Compressed-Air System
- Facility Breathing Air Subsystem

Payload Support Building (M7-0505)
NASA Spacecraft Services Depot

M7-0505 Payload Support Bldg

- Facility Usage
  - Warehousing: 30%
  - NASA Spacecraft Services Depot: 44%
  - M&P Engineering: 3%
  - Another Contractor (Development Usage): 23%
- 95,691 square feet Facility (Does not include POL Bldg, # M7-0554)
- Total No. ISS Line Items: ~71,600
- Predominantly used for small flight & ground parts that need conditioned environment
- Depot and M&P functions to support ORU processing; ORU maintenance and repair; and ground systems repairs.


High Density Storage Systems


Standard Shelve Storage


MRC and Garment Area


POL Storage

Supply Warehouse #1 (M6-0794)

M6-0794 – Supply Warehouse #1

- Facility Usage:
  - Warehousing for ISSP: 80%
  - Another Contractor (Institutional usage): 20%
- Facility Size: 69,939 square feet
- Predominantly used for flight and ground support equipment that needs conditioned environment.
- Total No. ISS Line Items: ~3,800
- Automated Guided Vehicle (AGV)
  - Provides 60% space/storage efficiency compared to conventional fixed aisle configurations


AGV Robots


Bulk Storage Area


Bulk Pallet Storage Area


Bulk Storage


AGV Storage Area


AGV Storage Area

Supply Warehouse #2 (M6-0698)

M6-0698 – Supply Warehouse #2

- Facility Usage
  - Warehousing for ISSP: 48%
  - Receiving and Packing & Crating: 52%
- Facility Size: 35,868 square feet
- Total No. ISS Line items: ~1,150
- Warehouse predominantly used for ground systems spares


Receiving


Warehouse Area


Warehouse Area


Packing & Crating